

## CLAIMS

We claim:

1 1. In a wireless communication system with a plurality of base stations  
2 communicating indirectly with a plurality of wireless communications devices  
3 through a plurality of repeaters, a method for more efficient use of radio spectrum,  
4 comprising:

5 communicating indirectly between a first base station and a wireless  
6 communication device using a first repeater and a first RF backhaul link;  
7 controlling a first smart antenna system of said first base station for  
8 improved spectral efficiency by selectively configuring said first smart antenna  
9 system to spatially isolate communications on said first RF backhaul from  
10 communications on a second RF backhaul of a second repeater.

1 2. The method according to claim 1 wherein said communicating step further  
2 comprises said first base station communicating with a second wireless  
3 communication device using said second repeater and said second RF backhaul  
4 link.

1 3. The method according to claim 1 wherein said second repeater  
2 communicates with a second base station located in a communication cell separate  
3 from said first base station.

1 4. The method according to claim 3 further comprising selectively controlling a  
2 second smart antenna system of said second base station for improved spectral  
3 efficiency by selectively configuring said second smart antenna system to spatially  
4 isolate communications on said second RF backhaul link from communications on

5 said first RF backhaul link.

1 5. The method according to claim 1 wherein said controlling step further  
2 comprises selecting from an antenna array at least one antenna element for use by  
3 said first base station in producing a directional antenna pattern having a major lobe  
4 in the direction of said first repeater.

1 6. The method according to claim 5 wherein said controlling step further  
2 comprises selecting a plurality of antenna elements from said antenna array for use  
3 by said first base station and adjusting at least one of a phase and amplitude of RF  
4 signals received and transmitted by said plurality of antenna elements to produce  
5 said directional antenna pattern.

1 7. The method according to claim 5 wherein said controlling step further  
2 comprises selecting a plurality of antenna elements from said antenna array for use  
3 by said base station and adjusting at least one of a phase and amplitude of RF  
4 signals received and transmitted by said plurality of antenna elements to produce a  
5 null in said directional antenna pattern, said null selectively directed toward said  
6 second repeater.

1 8. In a wireless communication system with a plurality of base stations  
2 communicating indirectly with a plurality of wireless communications devices  
3 through a plurality of repeaters, a system for providing more efficient use of radio  
4 spectrum, comprising:

5 a first base station configured for communicating indirectly with a wireless  
6 communication device using a first repeater and a first RF backhaul link;

7 a first smart antenna system operatively associated with said first base  
8 station, said first smart antenna system selectively configured by a control

9 processor for spatially isolating communications on said first RF backhaul from  
10 communications on a second RF backhaul of a second repeater.

1 9. The system according to claim 8 wherein said first base station  
2 communicates with a second wireless communication device using said second  
3 repeater and said second RF backhaul link.

1 10. The system according to claim 8 wherein said second repeater  
2 communicates with a second base station located in a communication cell separate  
3 from said first base station.

1 11. The system according to claim 10 wherein said second base station  
2 comprises a second control processor for selectively controlling a second smart  
3 antenna system of said second base station for spatially isolating communications  
4 on said second RF backhaul link from communications on said first RF backhaul  
5 link.

1 12. The system according to claim 8 wherein said control processor selects from  
2 an antenna array at least one antenna element for use by said first base station,  
3 and said at least one antenna element produces a directional antenna pattern  
4 having a major lobe in the direction of said first repeater.

1 13. The system according to claim 12 wherein said control processor selects a  
2 plurality of antenna elements from said antenna array for use by said first base  
3 station and said first smart antenna system includes phase and amplitude  
4 controllers for adjusting at least one of a phase and amplitude of RF signals  
5 received and transmitted by said plurality of antenna elements to produce said

6 directional antenna pattern.

1 14. The system according to claim 7 wherein said control processor selects a  
2 plurality of antenna elements from said antenna array for use by said first base  
3 station and said first smart antenna system includes phase and amplitude  
4 controllers for adjusting at least one of a phase and amplitude of RF signals  
5 received and transmitted by said plurality of antenna elements to produce a null in  
6 said directional antenna pattern, said null selectively directed toward said second  
7 repeater.